

THE SEWERAGE SYSTEM  
OF THE  
DISTRICT OF COLUMBIA

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BY

RALPH L. RECTOR

24 March, 1939.

## SUMMARY

This thesis is intended to be of a general nature, <sup>therefore</sup> and so much detail can be omitted. The sewerage system which the District of Columbia has today started with an act of Congress, March 3, 1889, which authorized the President to appoint a board to design and report on a suitable and sanitary sewerage system for the District. The system as it is today is a development of the recommendations of this board; Rudolph Hering, Samuel M. Gray, Frederic P. Stearns. The system provides for the removal of all sewage from the city and transmitting it to a sewage treatment plant at Blue Plains, D.C. It also provides for the protection of the low level area of about 900 acres in the commercial area of the city.

The sewage is collected by gravity interceptors. The more important interceptors are the East Side Interceptor, Rock Creek Main Interceptor, Anacostia Main Interceptor and the New Jersey Ave. & B St. Interceptor. The Rock Creek, Woodbridge, and Poplar Point Pumping Stations are all subordinate to the Main Sewerage Pumping Station at the foot of New Jersey Ave. on the Anacostia River. From the main pumping station the sewage crosses under the Anacostia River through two inverted siphons to the east bank. Here the sewage enters the outfall sewer and is transmitted to the treatment plant at Blue Plains, D.C. for treatment and disposal.

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### Interviews.

Mr. Cooke, Sewer Division, District Building.

Resident Engineer, Main Sewerage Pumping Station,  
New Jersey Avenue and "N" St., S.E.

THE SEWERAGE SYSTEM OF THE DISTRICT OF COLUMBIA

Poor grammar - "so" should only  
be used with "that"

This thesis is to be of a general nature, and <sup>consequently</sup> ~~so~~ it might be started with a short history of the development of the sewerage system. During and after the Civil War, the <sup>popu-</sup> population of the District of Columbia increased rapidly and in 1871 a Board of Public Works was formed, and among other municipal improvements, the construction of a sewerage system was begun. Sewers were planned and built to meet drainage requirements of that time without provision for future extension or development, and this resulted in the creation of a dangerous nuisance from the accumulation of sewage in the populated sections of the city. To remedy this condition, and in the interest of public health, an act of Congress of March 3, 1889, authorized the President of the United States to appoint a board of three competent sanitary engineers to design and report upon a suitable and sanitary sewerage system for the District of Columbia. This board, composed of Rudolph Hering, Samuel M. Gray and Frederic P. Stearns, was appointed on August 17, 1889, and made an exhaustive study of the requirements for an efficient sewerage system. The system as it exists today is a development of the plan and recommendation of this board, and it is essentially made up of a combined system of sewers, carrying both sanitary and storm-water drainage, in the older sections of the city, while in the newer sections the policy is to construct separate system sewers; that is to have



separate carriers for sanitary drainage and storm water.

The disposal system now provides for the removal of all sewage from the city and discharging it through an outfall sewer that terminates in the suction well of a pumping station built in the northerly part of the treatment plant at Blue Plains, D.C. The system also provides for the protection of the low level area, about 900 acres in extent, from flooding when the Potomac River is at freshet stage. It is necessary to pump the storm-water drainage for this entire area, as well as all sewage. At present about 30,000 million gallons of sewage and ordinarily about 500 million gallons of storm-water are pumped annually.

#### COLLECTION OF SEWAGE WITH INTERCEPTORS

With the exception of certain relatively small areas situated mostly in Chevy Chase, Tenly Town, Brookland, and Benning, <sup>Sp?</sup> practically all of the thickly settled portions of the District of Columbia are sewered by the combined system, both domestic sewage and surface water run-off being carried in the same conduits. Recent extensions to the system, however, wherever possible, have been made according to the separate plan, in which the domestic sewage is carried in sewers and the storm-water run-off in storm-water drains. During the past ten years, the storm-water drains have been designed by the so-called "rational method," with allowance for the run-off from a storm which, on



the average, would not occur oftener than once in about thirteen years.

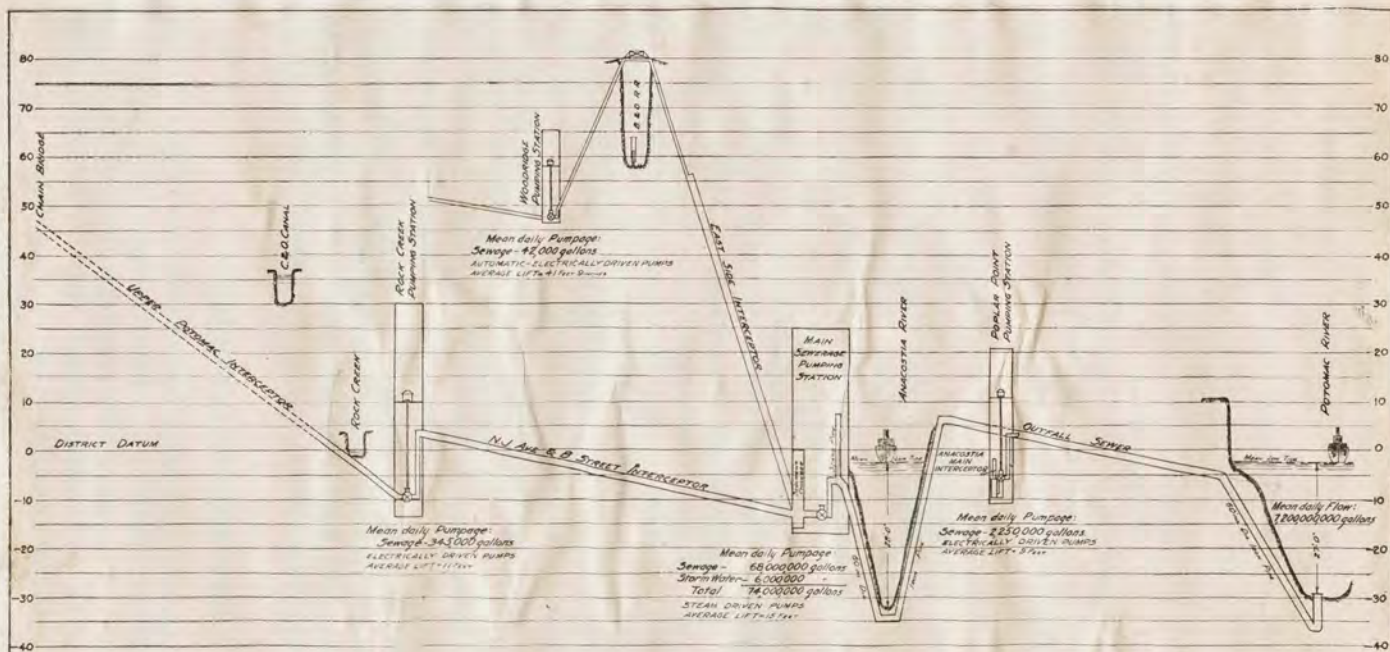
Gravity intercepting sewers for collecting the dry weather flow of sewage in the combined sewers have been built according to the plan recommended in the 1890 Hering, Gray and Stearns report. These sewers were designed to carry, when flowing full, a maximum rate of flow of 300 gallons per capita per day from the estimated tributary population. At present, there are a large number of storm overflows on the combined sewers, many of which function in times of storm. These storm overflows, through which a mixture of sewage diluted with storm water is discharged, are distributed along the watercourses of the District as follows: three along the Potomac River above the Key Bridge, eight along the Georgetown Channel, twelve along the Washington Channel, twenty-eight along Rock Creek, and eighteen along the Anacostia River. All the sewage from the intercepting sewers lying to the west of the Anacostia River is brought to a pumping station, situated on the Anacostia River at the foot of New Jersey Avenue, S.E., and is known as the Main Sewerage Pumping Station. There is also a pumping station near the mouth of Rock Creek, the Rock Creek Pumping Station, which lifts the sewage from the west end of the District about fifteen feet into the New Jersey Avenue and "B" Street interceptor. There is also a



small pumping station, the Woodbridge Pumping Station, in the northeasterly section of the District. The sewage from all the area east of the Anacostia River is pumped into the outfall sewer at the Poplar Point Pumping Station, situated on the east bank of the Anacostia River directly opposite the Navy Yard.

The system of interceptors is so designed that in the thread of each of the large valleys throughout the District one of the main interceptors collects all the sewage from that particular section and carries it to the main pumping station. The Upper Potomac Interceptor extends along Canal Road and intercepts all sewage of the westerly portion of the District. The Rock Creek Main Interceptor is located in the thread of Rock Creek Valley to the District line and intercepts all sewage from that valley as well as sewage from Maryland which formerly discharged into Rock Creek. The above two interceptors terminate at the Rock Creek Pumping Station. The East Side Interceptor flows directly to the main pumping station and intercepts all sewage from that section of the District draining toward the west bank of the Anacostia River. The Anacostia Main Interceptor intercepts sewage from that section of the District draining to the east bank of the Anacostia River, and terminates at the Poplar Point pumping station. The Oxon Run Interceptor receives drainage from the southeastern section of the city and discharges it directly to the Sewage Treatment Plant at Blue Plains, D.C. These interceptors vary in size from three feet to eighteen feet in diameter.





SEWER DIVISION-ENGINEER DEPARTMENT  
DISTRICT OF COLUMBIA  
ELEVATION DIAGRAM  
SHOWING  
NECESSITY OF MAIN AND SUB PUMPING STATIONS  
FOR LIFTING SEWAGE

### NECESSITY OF MAIN AND SUB PUMPING STATIONS FOR LIFTING SEWAGE



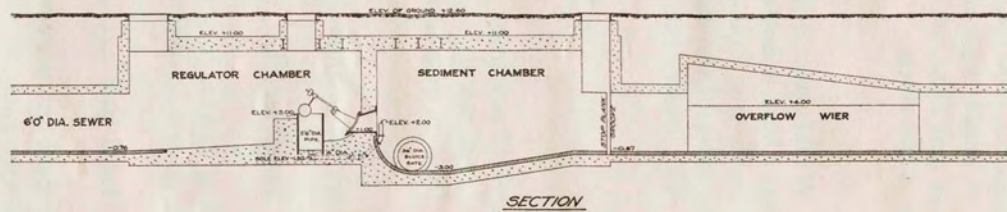
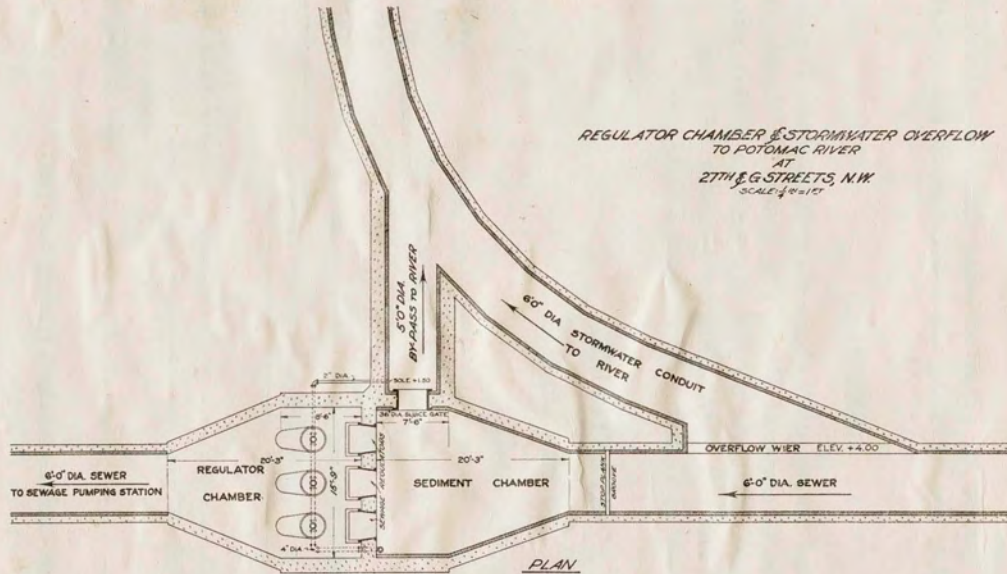
### THE LOW LEVEL DISTRICT

There is a large tract of land in the central portion of the city known as the Low Level District which was subject to inundation by freshets in the Potomac River. To protect this area from flooding, dykes have been constructed at the two lowest points where river water might enter, and all storm water is pumped from the dyked area. This low level district is segregated by the construction of high level storm sewers along the margins which intercept all upland storm water that might pass into and through the low district. This area is bounded on the north by the "F" Street Interceptor, on the west by the dyke line at 17th and "B" Streets <sup>NW?</sup> and by the 4½ Street High Level Interceptor, on the east by the Tiber Creek and New Jersey Avenue High Level Interceptor, and on the south by the dyke line of the James Creek Valley. *(Should show on a map.)*

A trunk sewer has been constructed through the center of the low district, the "B" Street and New Jersey Avenue Trunk Sewer, so designed that it will convey the storm water from the whole of the low area to the main pumping station during freshets. However, at ordinary stages of the river, it discharges the storm water of the heaviest rainfalls from the greater portion of the low area by gravity. The smaller portion, known as the park area, includes the Monument, Agricultural and Smithsonian Grounds. To provide for the drainage of this area, a stormwater sewer has been constructed which discharges into the Tidal Reservoir near the foot



REGULATOR CHAMBER & STORMWATER OVERFLOW  
TO POTOMAC RIVER  
AT  
27TH & G STREETS, N.W.  
SCALE 1" = 10'-0"





of 17th Street west. This storm sewer is designed with regulating gates at its upper end so that the storm water when the river is at freshet stage may be discharged into the main storm water conduit of the low area.

The sanitary sewage from deep basements of this low area is provided for by a separate system sewage carrier, the Low Area Trunk Sewer, which delivers the sewage to an independent set of pumps in the main pumping station in order that the hydraulic level will not be affected by the hydraulic gradient of the storm discharge.

#### MAIN SEWERAGE PUMPING STATION

The Main Sewerage Pumping Station is located at the foot of New Jersey Avenue, S.E., on the Anacostia River, at a point where the most satisfactory crossing could be obtained, as a point convenient for connection from the various intercepting sewers. The Main Sewerage Pumping Station has two functions; first, to pump into the outfall sewer the entire dry weather flow of sewage from the area west of the Anacostia River, and second, to pump into the Anacostia River at times of high water in the river, the surface water run-off from the low level area lying in the central portion of the District. In the pumping station there are thirteen pumps, all steam driven. Twelve pumps are of the vertical centrifugal type. This last pump, as well as one of the vertical pumps, has a nominal capacity of



GENERAL PLAN OF BUILDING  
Showing  
CONDUITS, CHAMBERS Etc.  
SCALE - 1"=20'

[illegible]

NOTE:- All HYDRAULIC GATES Slows  
CONTROLLED From ENGINE ROOM

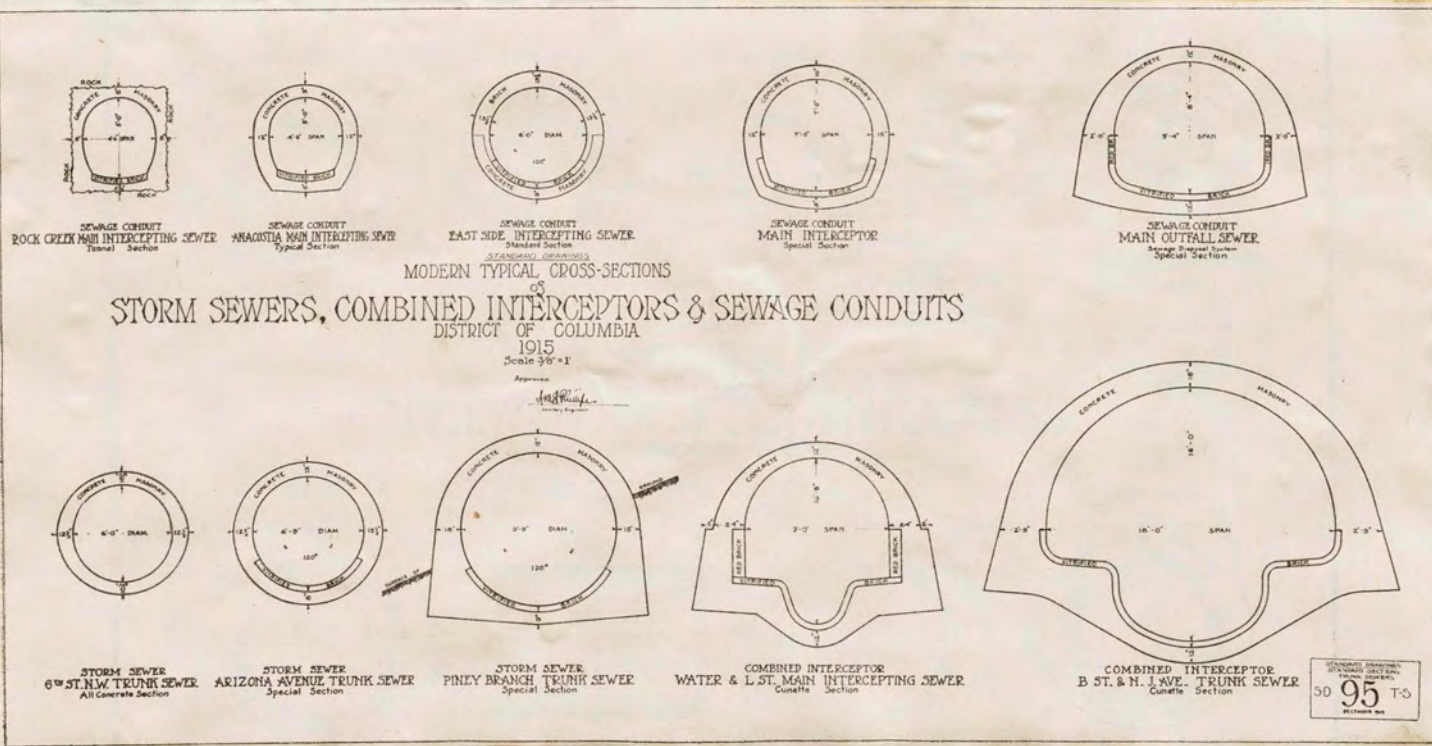


20,000,000 gallons daily, and one or the other of these pumps is used to pump the flow from a low level sewer, the Low Area Trunk Sewer, into which is discharged the domestic sewage from deep basements in the low level district. Of the other eleven pumps, three discharge into the outfall sewer. Each of these pumps has a nominal capacity of 65,000,000 gallons daily, at 15 feet total head. The remaining eight pumps are for pumping storm water, and each of these pumps has a nominal capacity of 65,000,000 gallons daily, with heads varying from 3 to 5.5 feet.

At the Main Sewerage Pumping Station there is a sediment chamber, for removing the heaviest suspended solids from the domestic sewage, and also, coarse cage racks for screening the sewage, prior to its being pumped. The sediment chamber is cleaned periodically and the sediment, or grit, used for fill behind some of the river walls built along the Anacostia River. The screenings are pressed and burned under the steam boilers.

At the Main Sewerage Pumping Station, the sewage is pumped into two 60-inch cast iron pressure sewers, called "inverted siphons," laid under the Anacostia River. From these siphons the sewage flows through the outfall sewer, which extends in a general southerly direction and terminates in the pumping station in the Sewage Treatment Plant at Blue Plains, D.C. The outfall sewer has a basket-handle section, 9 feet 4 inches wide by 8 feet 4 inches high, and is laid on a slope of 1 in 100.







3,000. This sewer was designed, when flowing full, for a sewage flow of 150,000,000 gallons daily, corresponding to a maximum rate of flow of 300 gallons per capita per day from a population of 500,000 as recommended in the 1800 Hering , Gray and Stearns report. From pumping station records and from flow observations it appears that the outfall sewer may have a somewhat greater capacity than that for which it was designed.

This outfall sewer delivers the sewage to the treatment plant at Blue Plains, D.C., where the sewage is treated, separated and disposed of.

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